

CHARTS  
FLOW PLANS

PAINT NUMBERED  
TREES

PERMANENT  
SAMPLES

UNIT  
RECORDS

TIMBER  
BOOKKEEPING

THE DIAMETER  
TAPE

TRIAL  
BALANCE

PORT-A-  
PUNCH

# FOREST CONTROL

by

# CONTINUOUS INVENTORY

A  
13.2:  
JUL 81  
134

"Today I have grown taller from walking  
with the trees."

...Karle Wilson

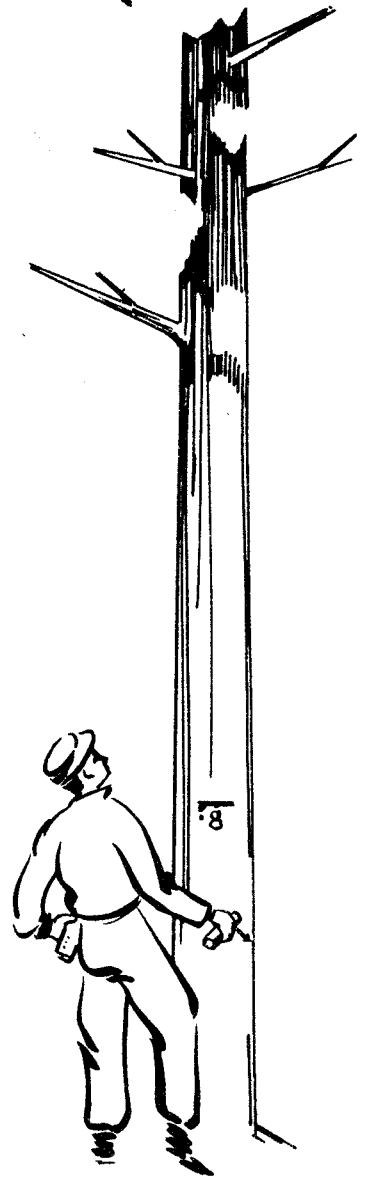
Milwaukee, Wis. May, 1965 No. 134

The lopped tree in time may grow again,  
Most naked plants renew both fruit and flower.

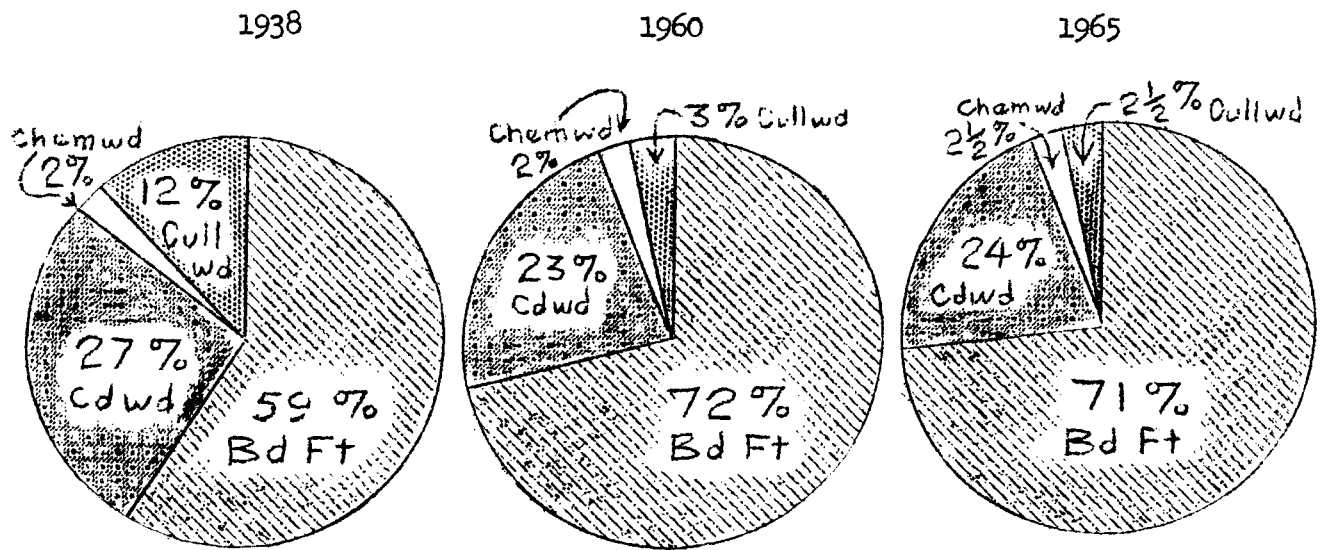
ROBERT SOUTHWELL (1561-1595)

Times Go By Turns





FORESTRY SCHOOL LIBRARY  
COPY NO. \_\_\_\_\_



A VOLUME PICTURE OF PLOTS 131 - 135  
PERCENT OF TOTAL BASAL AREA BY PRODUCT



PER ACRE VOLUME

	<u>1938</u>	<u>1960</u>	<u>1965</u>
Sq. Ft. B.A.	84.4	119.8	133.2
Trees	103.0	123.0	132.0
 Bd. Ft.	4749.2	9125.4	10,338.2
 Cordwood	4.6	6.4	7.7
 Chemwood	0.3	0.6	0.7
 Cullwood	3.6	0.9	1.0

PER ACRE PER YEAR GROWTH IN VOLUME

	<u>FIRST 22 YEARS</u>	<u>FULL 27 YEARS</u>	<u>LAST 5 YEARS</u>
Sq. Ft. B.A.	1.61	1.81	2.68
Trees	.91	1.08	1.80
Bd. Ft.	198.9	207.0	242.5
Cordwood *	.18	.20	.28
Chemwood	.02	.02	.02
Cullwood	- .12	- .10	.01

\* SAWLOG INGROWTH TREES - When Cordwood Trees Grow into Sawlog Status, the Growth is a Bd. Ft. Gain. It is not a Cordwood Loss.

SAWLOG OUTGROWTH TREES - When Sawlog Trees Depreciate into Cordwood Status, the Growth is a Bd. Ft. Loss. It is not a Cordwood Gain.

CFI COMPARES AND CONTRASTS THE GROWTH OF THE NORTHERN HARDWOOD FOREST  
AFTER LIGHT SELECTIVE CUTTING

PART II

Review

It has been shown in Part I that volume, quality and value increment are reasonably high 27 years after heavy selective cutting on Ford Motor Company lands. Sawlog growth varied between 113 and 147 board feet net Scribner scale per acre per year at varying time intervals during the period. The board foot rate of growth was very high, averaging 10.2% simple interest on a capital growing stock of 1,174 board feet in 1938.

Light Selective Cutting Also Sampled and Studied

Throughout the 44,000 acres of northern hardwood timber classified today as selectively cut by the management of Ford Fund Forest, there is much variation in the amount of residual volume. Timber marking 25 to 30 years ago on Ford Motor Company lands was not a very particular or consistent job. Stands were heavily marked when the sawmills needed wood and moderately marked when the yards were full. When a particular species was in short supply, a greater proportion of that species was marked for cutting, and vice versa. In spite of this silvicultural inconsistency, a worthwhile residual stand of commercial sawlog trees remains on more than half of the 77,000 acre forest of Ford Fund lands today.

One area of timber with a fine residual stocking is located south of Ravine River in the SW SW of Section 11, T. 51 N., R. 31 W. Inventory results and selective cutting returns on the plots in this area furnish the descriptive and tabular material which is the bread and gravy of this report.

Soil, Site and Ecology

Five CFI sample plots were established south of Ravine River soon after the area was cut over 28 or 29 years ago. The timber was northern hardwood sawlogs heavily mixed with hemlock. It is estimated that the sawlog stand averaged 9,000 to 11,000 board feet per acre before cutting. It was a dense forest with heavy shade. The ground cover vegetation and young growth were very light in the understory. Crown openings left after the cut, filled in gradually with herbaceous and shrubby plants. Some sapling stock occurs in openings today, but it is scant and in patchy arrangement since the crown canopy was little disturbed by either the light cut or subsequent mortality.

The soil type on all 5 plots is Munising silt loam. Drainage is good and there is a 2% to 8% slope to the north and northeast. Although excessively dry at the time of classification, the soil pits showed a very good Munising profile in all of the samples, and this is true also of the entire 40-acre area studied.

### History of Forest Treatment

The cutting of this stand was in marked contrast to that of the plots south of Alberta. There was no conscious high grading. Six of the hardwood trees left in 1938 had No. 1 grade butt logs. Fine, large, sound hemlocks of reasonably good grade also remained. Left uncut were 9 trees over 18" in DBH. These contributed 2,069 board feet to the total residual volume of 4,749 board feet in 1938. A few hemlock trees over 23" and some maple and birch over 19" in diameter remained after the selective cut. The 5 sample plots are quite representative of the entire 40-acre tract in which the plots are located.

Spacing of the residual commercial sawlog trees was very good and 60 pole-size stems per acre also remained as potential sawlog ingrowth material.

Logging damage, as indicated on the original tally sheets, was severe. Eighteen trees were damaged in varying degree. In spite of this and the removal of an estimated 4,000 or 5,000 board feet of sawlogs per acre, forest conditions were excellent for growth in 1938 when the per-acre volumes left included these products:

4,749 net Scribner board feet of sawlog trees  
 4.6 cords of hardwood and hemlock pulp or cordwood  
 .3 cords of chemwood  
 3.6 cords of cullwood

There have been no cutting operations in or near these CFI plots since 1938.

### The CFI Cruise Again Discloses Excellent Volume Growth

It is possible to say, without question or doubt, that the harmful effects of the light selective cut were slight. Tree and plant associations changed little, and the site was well protected by the good crown canopy left. In general, change in ecological conditions was minimal. This is effectively demonstrated by the number of ingrowth trees. Only 43 cordwood trees per acre grew into the 5" DBH class during 27 years after the light selective cut, but there were 68 cordwood ingrowth trees after the heavy selective cut.

Capital stock remaining was not only high in quantity but the trees were vigorous and of good quality. Grade 1 and 2 logs trebled during the 27-year growing period. Although the rate of board foot growth declined from 10.2% south of Alberta to 4.4% in the Ravine River plots, the volume growth per acre averaged 207 board feet for the period. Per acre volume growth for the 27-year period is 43% above the south Alberta plot results.

### The 27-Year Growth

5,589 net Scribner board feet of sawlog trees  
 5.4 cords of hardwood and hemlock pulp or cordwood  
 .5 cords of chemwood

During this period, 2.7 cords of cullwood per acre were lost to natural mortality. Basal area per acre increased 49 square feet and there was a gain in net tree count of 29 trees per acre.

#### A Few Forest Management Implications

The selective cut made in 1936 or 1937 removed an estimated 4,000 or 5,000 board feet of sawlogs from the acre of measured sample. Basal area left was 84.4 square feet, and this is only 5% less than that remaining on the heavily cut plots; but here the resemblance ends. Wood growth, in the main, was laid on good trees. Only 13% of the basal area left on the Ravine River plots was in cull and chemwood trees. On the south Alberta plots this 13% catapulted to 46%.

Although the Ravine River plots had a good growth per acre, their rate of growth in simple interest was a great deal less than the south Alberta plot growth rate. This is due to the high volume of capital stock left in 1938.

#### The 27-Year Rate of Growth After Light Selective Cutting

Average rate of growth in board foot volume	4.4%
Average rate of growth in board foot value	26.4%
Average rate of growth in cordwood and chemwood volume	4.5%
Average rate of growth in cordwood and chemwood value	11.1%

We cannot draw hasty conclusions from this rate differential between heavy and light cuts. True, the sawlog growth rate is 58% less than on the heavily cut plots, and the value growth rate is 37% less, but this does not mean that the Ravine River plots are not a good investment in timber growth. The plain fact is, this forest has been a going concern every year since the first cut.

There has always been wood to cut. This, in part, is because trees of commercial size were stored on the stump and from these trees a later selective commercial operation has always been possible. The timber markers, however casually, sweetened subsequent cuts. They left loggable trees from which to later collect the growth of the stand. They reserved from use sufficient trees to provide an ever salable woods available for any emergency at any time, and capable of being handled indefinitely on the same selective basis without hiatus in wood harvest, woods work or woods wages.

Under the heavy cutting procedures the stand was not well suited to operation on a recurrent selective basis. There was insufficient wood suitable for economic logging. The woods has been a going concern only in the past 5 or 10 years.

WOOD AVAILABLE FOR POSSIBLE CUT PER ACRE AT EACH CFI MEASUREMENT  
LIGHT SELECTIVE CUTTING

<u>Year</u>	<u>Board Feet</u>	<u>Chemwood and Cordwood</u>	<u>Cullwood</u>
1938	1,596	1.0	1.2
1960	4,158	1.7	.3
1965	4,461	2.0	.3

There are also from 2 cords to 4 cords of top wood per acre

The volumes recorded for cut at each measurement period include in the main trees of low vigor, high risk and heavy cull. A few of the trees measured in 1960, and again in 1965, and shown with this tabulation, are not troubled by these extreme weaknesses. They are recommended for cut to reduce basal area and increase quality wood production on surrounding trees of better stature.

It is interesting to note the effect on the square feet of basal area left, if the wood available for possible cut is removed. It is evident that for the year 1938 some of the trees now indicated for cut might better have been taken in 1938. Doubtless some of the trees then removed might better have been left, for the early marking was much guided by tree size and little by tree condition. If all of the poor trees had been cut in 1938, only 53.5 square feet of basal area per acre would have remained. This is insufficient. However, the cuts recommended for 1960 and 1965 result in a very desirable basal area residual, and it is high time that these cuts are made. They are already 5 to 10 years overdue.

BASAL AREA PER ACRE AFTER LIGHT SELECTIVE CUTTING

<u>Year</u>	<u>Total Basal Area Left</u>	<u>Basal Area Cut of Poor Trees</u>	<u>Basal Area of Good Trees Left</u>
1938	84.4	30.9	53.5
1960	119.8	46.9	72.9
1965	133.2	50.2	83.0

This tabulation makes it clearly evident that the time has come to remove all trees of low vigor, high risk and heavy cull, all of the cullwood and chemwood trees, and even an occasional tree of moderately good condition, to take the basal area down to approximately what it had been immediately after the selective cut of 1936 - 1937.

CAL STOTT  
Forester